

## THE SUMATRAN "TRILOBITE LARVA"

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The appellation of "Trilobite Larva" has been in use for many years to designate the larvæ of certain highly aberrant malacoderm beetles. These attain a length of one to several inches, with wide, greatly flattened body. The three thoracic segments are expanded laterally forming a sort of carapace and the abdominal segments bear long, curved projections. These gross characters give the larvæ an almost comical, but nevertheless extraordinarily striking resemblance to certain long-extinct trilobites.

The first reference to these larvæ appears to be that of Perty made over a century ago, in 1831. His account relates to a form from Java which Westwood figured in his "Modern Classification of Insects"<sup>1</sup> a few years later. With his usual taxonomic acumen, Westwood suspected that this larva belonged to some species of the family Lycidæ. Since that time a number of additional species have been discovered in various parts of the Indomalayan region to which they they are apparently restricted. They seem to be best represented in Borneo where at least six distinct types have been discovered. These have been dealt with at length by Mjöberg in 1925<sup>2</sup> who gives an historical and descriptive account that need not be repeated here. Mjöberg was successful in rearing one Bornean species to maturity and found that the large larvæ are females which are destined to undergo practically no external change on becoming adult. Unfortunately he overlooked a paper by the Dutch naturalist, J. C. Koningsberger<sup>3</sup> published more than twenty years pre-

<sup>1</sup>Vol. 1, p. 254; fig. 27, 1-2 (1839).

<sup>2</sup>The Mystery of the so-called "Trilobite Larvæ" definitely Solved. *Psyche*, vol. 32, pp. 119-153, 2 pls.

<sup>3</sup>Een Geheimzinnige Larve. *De tropische Natuur*, Jaarg. 1, pp. 17-20 (1912).

viously where the transformation of the common Javan species was accurately described. Koningsberger observed the molting of the large larvæ into larviform adults and proved them to be sexually mature females as several of his specimens deposited perfectly formed, though infertile, eggs. Koningsberger was disappointed not to secure the male which was discovered first by Mjöberg. The latter is a small lycid beetle, quite similar to the other members of the family Lycidæ and scarcely one-tenth the length of the huge larviform female. The larval form of the male has never been discovered; in fact no very small larvæ have ever been recorded and Mjöberg found only large ones obviously greatly in excess of the size which the male would attain before transformation into such a small adult. On this account he supposed that the larvæ must be sexually dimorphic, but this supposition does not necessarily follow although it must be admitted that the female forms are extraordinarily aberrant while the adult male is a perfectly normal beetle.

The species here illustrated is from the highlands of southern Sumatra, near the town of Pagaralam, in the edge of a jungle close to a waterfall a few kilometers out of the town at an altitude of about 3-400 feet. My wife and I had stopped to collect near the waterfall and she discovered two specimens beneath some loose rotted wood lying in an open area. We immediately instituted a search for further examples in the neighborhood, but without success.

A comparison of the two larvæ reveals that they are very different from any of the Bornean forms described and illustrated by Mjöberg. They resemble closely, however, one collected somewhere in the Malay peninsula illustrated by him. This specimen is in the Kuala Lumpur Museum, but no locality is mentioned and presumably its exact provenience is not known.

When I first examined the two Sumatran specimens, it seemed that they must be identical with the Javan one as they agree well with Westwood's figures and the description given by Perty. Furthermore, a cursory examination of specimens from Java which I saw later in the Buitenzorg Museum revealed no obvious differences and Mjöberg refers a specimen collected near Pematangsiantar, Sumatra to the

original Javan species. Several earlier records of such larvæ from Sumatra also assume they are identical with the Javan one. There are, however, in the Museum of Comparative Zoology four specimens from Java<sup>4</sup> and closer scrutiny shows the Sumatran species to be quite distinct. It is evidently widely distributed as our specimens are from southern Sumatra and Mjöberg found it in the northern part of the island, strangely enough in a region where we failed to discover it although we spent some weeks in the jungle near Pematangsiantar. Kolbe in 1887 recorded its occurrence at Penang on the west coast.

In the collection of the Museum of Comparative Zoology there are a number of other trilobite larvæ one of which appears to represent a species that has never been described or figured and I am appending at the end of the present note a description of this as well as the Sumatran one together with the morphological characters that may be used to distinguish the several species that are available to me. The species are all readily recognizable by good taxonomic characters and these may be applied to the diagnosis of other species as they may come to the notice of entomologists.

#### THE SUMATRAN SPECIES

(Plate 2; Text-fig. 1)

Attaining a length of at least 37 mm. Color dark brown, but fading considerably in alcohol; the tubercles on the dorsal thoracic and abdominal segments shining black, the underside likewise brown, with the abdomen blackish at the sides and apex; the legs blackened apically. The lateral abdominal projections with yellowish tips, the pale color extending further basad on the apical segments, the last segment entirely pale both above and below. Thoracic segments rather wide and short, the mesothoracic dorsum almost two and one-half times as wide as long. The shining black tubercles or warts well developed, one on each side of the pronotum; a pair similarly placed on the meso- and the metanotum and all three segments with a pair of minute

<sup>4</sup>One from "Java" (Professor Roland Thaxter) and three from Bantar Gelbary (Bryant and Palmer).

ones at the posterior margin near the middle; abdominal tubercles very small, transverse, arranged in pairs near the middle of the hind margin of each of the basal six tergites, but these are lacking on the last three tergites. Lateral horns or processes on the abdomen long; except the first, all are curved backwards, but not upwards; those of the

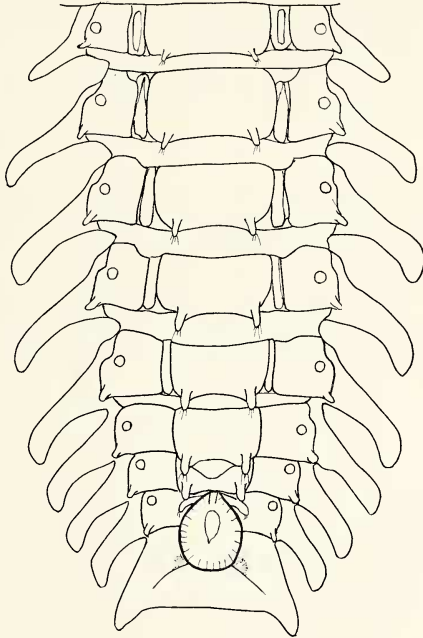


Fig. 1. Ventral view of abdomen of Sumatran "Trilobite" larva.

last tergite short, simply extending its lateral angles; those of the first short and pointed at tip, the others blunt. On the underside the meso- and metasternum each bear a minute, convex tubercle at the center. Each abdominal sternite with a tooth-like projection on each side at the posterior angle. Each of the pleurites, which lie directly below the lateral processes of the terga, is produced at the posterior angle into a blunt tooth and each is perforated by a deep, circular, spiracular opening. The two spiracles of the thorax are similar and lie at the anterior margin of the meso- and

metathorax, just inside the lateral shelf-like extensions of these segments. Dorsally the anterior margin of these is sharply truncate with a slight, rounded tubercle at each side and a pair of more pronounced ones medially, separated by a slight median emargination.

In its general habitus this species is very similar to one illustrated by Mjöberg from the Malay Peninsula, but his photograph is not sufficiently clear to indicate this definitely, and other accounts of what may be the same species are likewise lacking in details.

#### THE JAVAN SPECIES<sup>5</sup>

(Plate 2)

The four specimens of this form are all smaller than the preceding species as the largest one does not exceed 30 mm. in length. The color is darker, but this is quite probably due to the preservation. The thorax is fuscous above or darker and the abdomen piceous or nearly black, with the lateral projections orange yellow on the apical half. Structurally, the differences are as follows. The larger, posterior tubercles of the meso- and metathorax are more strongly transverse; the posterior margin of the metanotum bears four small warts, the additional ones more minute than the median pair and forming with them an equidistant series of four. The abdominal warts are present on the seventh and eighth segments so that there are eight instead of six pairs. The thorax is wider, the mesonotum measuring nearly three times as wide as long. The lateral abdominal projections are stouter, more swollen apically and quite evenly rounded at the apex.

One specimen bears the label "Java, R. Thaxter". The others, collected by Bryant and Palmer, are from Bantar Gelbary.

#### A BORNEAN SPECIES

(Plate 3)

A series of specimens from Sadong, Sarawak, Borneo collected by Harrison Smith are apparently the form figured

<sup>5</sup>Burgeois, (Bull. Entom. Soc. France, 1899, p. 61) has given a description of this form, but not having the Sumatran one for comparison does not refer to the differential characters.

by Mjöberg as "No. 5" which he speaks of as the common lowland type in this portion of Borneo. It is much lighter in color, being a uniform light brown with the dorsal protuberances and warts greatly reduced. The pronotum and abdominal tergites lack the warts completely and those of the meso- and metanotum are reduced to a single elongate, streak-like, smooth elevation midway between the median line and lateral margin, longer on the metanotum. The mesonotum is very wide, fully three times as broad as long and the metanotum is produced at each side into a very long, obtuse lobe. The lateral projections on the abdominal segments are very long, curved evenly upwards and backwards and evenly attenuated from the base to the tip, with the basal one as usual much shorter. The anterior margin of the pronotum bears four prominent rounded or more or less tooth-like tubercles or projections separated by conspicuous emarginations. The specimens range in size to fully 45 mm.

A description undoubtedly of this form has been given by Bourgeois<sup>6</sup> and the preceding paragraph refers mainly to characters of use in differentiating it from other species.

#### CAPTAIN BARNARD'S LARVA

(Plate 3)

This is a very striking form, similar in habitus to the Bornean species of which Mjöberg reared the female and later secured the male, *Duliticola paradoxa* Mjög.<sup>7</sup> It differs at once, however, in the presence of large shining tubercles on the disk of the three thoracic segments. The arrangement and size of these raised areas are the same as in the Sumatran species as are also the minute warts on the posterior margin of these segments, except that the latter are very minute. The mesonotum is slightly more than twice as wide as long. The abdominal tergites bear also pairs of minute warts at the posterior margins; these are very distinct, becoming smaller on each succeeding tergite and not visible at all beyond the fifth. The lateral processes of the abdomen are very strongly curved upwards and posteriorly,

<sup>6</sup>Bull. Entom. Soc. France, 1899, p. 59.

<sup>7</sup>This is apparently the form described at length, but not named by Hanitsch in 1900 (Journ. Roy. Asiatic Soc., Straits Br. No. 34, p. 78).

almost hooked at their obtusely rounded tips. The entire larva is piceous or black, about 50 mm. in length.

The exact provenience of this specimen is unknown. It has been in the Museum of Comparative Zoology for over 60 years and bears the label "J. Barnard, East Indian Ship 'Monsoon' ". I have figured it as it adds still another species to the considerable number already known.

#### EXPLANATION OF PLATES

##### PLATE 2

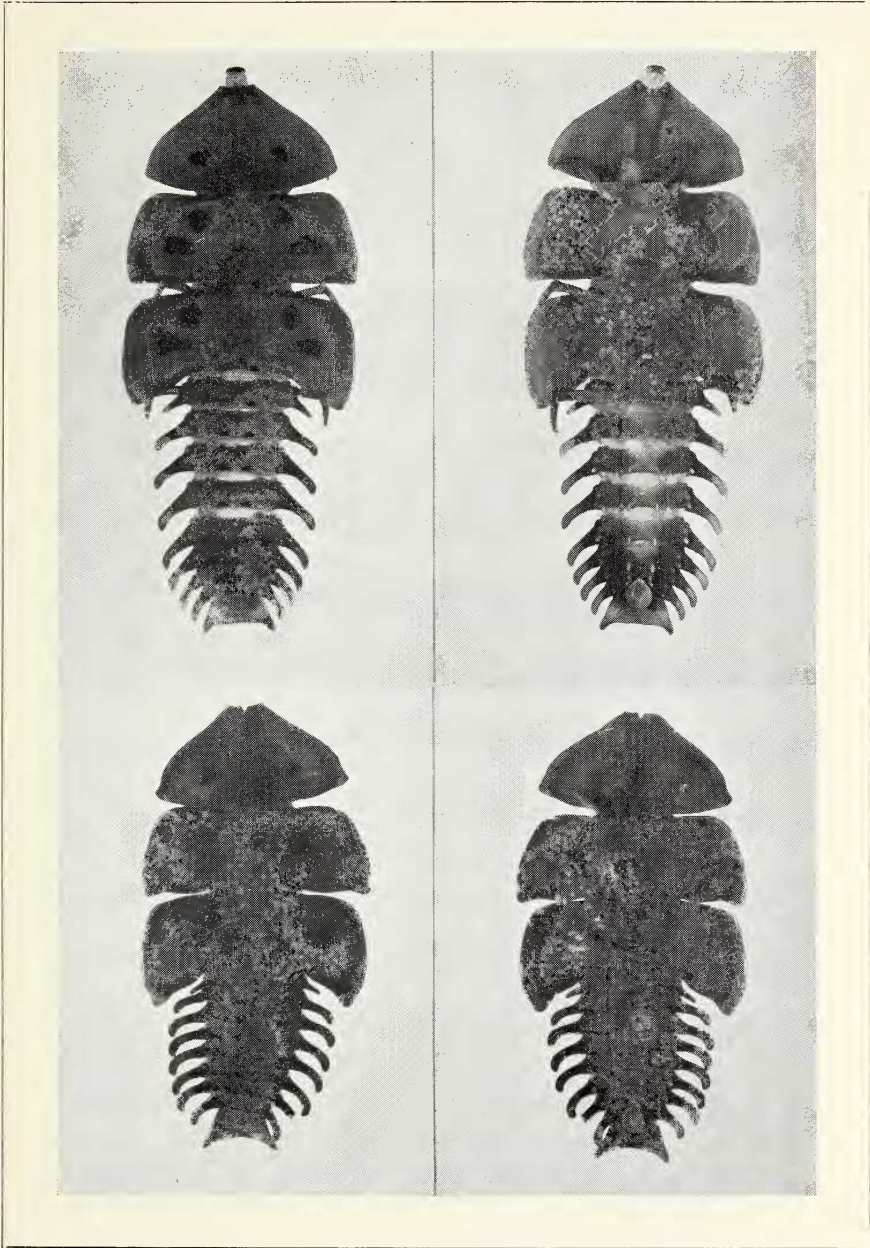
Upper two figures, Sumatran "trilobite" Larva.

Lower two figures, Javan "Trilobite" Larva.

##### PLATE 3

Upper two figures, Bornean "Trilobite" Larva.

Lower two figures, Barnard's "Trilobite" Larva.



Brues — "Trilobite Larvæ"



